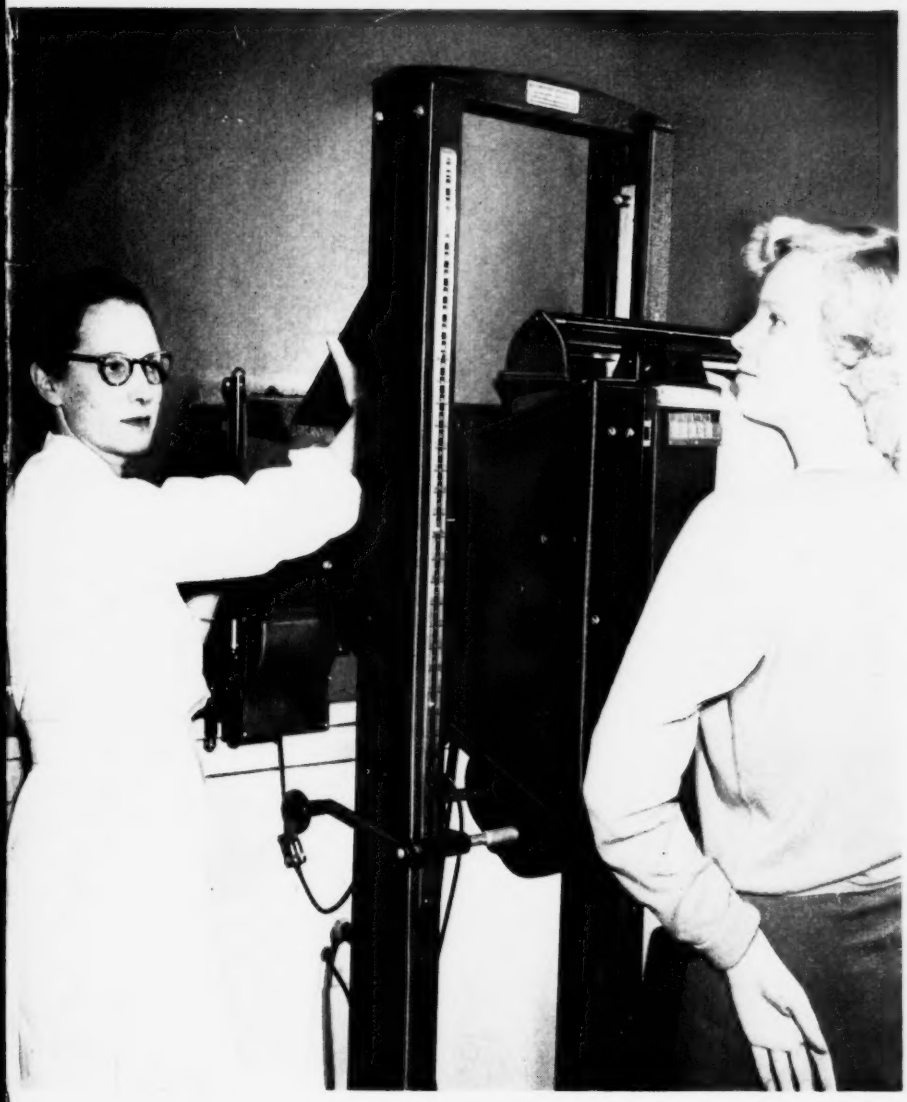
Occupational HEALTH REVIEW

VOLUME 5, NUMBER 1



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Occupational Health Division

DEPARTMENT OF NATIONAL HEALTH AND WELFARE • OTTAWA

NOVEMBER, 1953

Index

Ontario's Silicosis Act 1

University Health Service 4

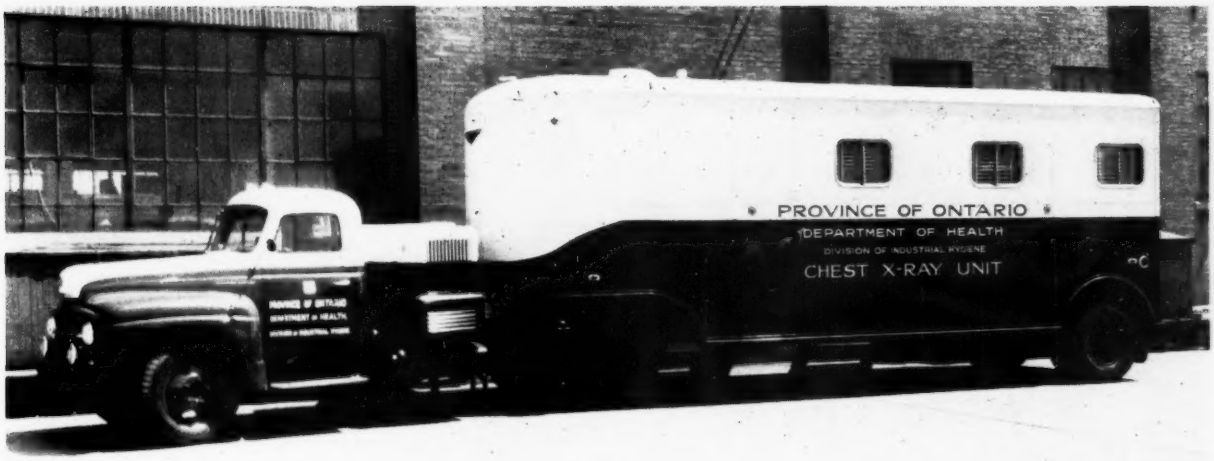
Dental Health Services in Industry 5

Records in the Practice of Industrial Health 7

Industrial Ventilation — Some Basic Considerations on its Application 11

The Role of Psychiatry in Industrial Health 14

Fig. 1



Ontario's Silicosis Act

By R. B. Sutherland, M.D., C.M., D.P.H.
Division of Industrial Hygiene
Department of Health for Ontario.

In 1928 provision was made in the Ontario Mining Act for the pre-employment and annual examination of miners underground and in certain surface occupations. Any assessment of the benefit resulting from the careful selection and supervision of employees during the past 25 years is rendered difficult by the fact that during this time the mining industry has done much to reduce exposure to silica dust. Furthermore, twenty-five years is probably too short a period to enable a final analysis of the effectiveness of the steps taken to reduce risk of silicosis. Nevertheless, much has been accomplished. Among men dying with silicosis, the number of years' of exposure required to produce the disease has risen from around 14 years to approximately 22 years. The percentage of silicotics dying from tuberculosis has fallen from 79% to nearly 40%. Furthermore, only 40 cases of silicosis or of silicosis with tuberculosis have developed in men hired since 1928.

Though the number of cases of silicosis, with or without tuberculosis, in this group is small in relation to the number of men employed, review of the films which have been taken on each man over the years indicates that in view of present day knowledge, probably some of these cases might have been prevented. At the time they were employed, almost all of the 40 men had evidence of old tuberculosis infection. In many cases, the evidence was slight, and in all, the disease was thought to be healed. The adverse effect of inhalation of silica dust in the presence of tuberculosis is now well known, both from clinical and experimental evidence. Considering the quality of the radiographic film available 25 years ago, and the general lack of clinical and radiological experience in the field of silicosis which was then available to guide us, it is perhaps surprising that more cases have not developed. In any event the above figures serve to illustrate the value of careful selection of employees for work in silica exposure, particularly with regard to the importance of discovering evidence of active or old tuberculosis.

During the years 1947 to 1951 inclusive, x-ray surveys by the mobile units of the Ontario Division of Industrial Hygiene were conducted on employees exposed to silica in Southern Ontario. These surveys were made possible by the voluntary cooperation of employers in foundries, in porcelain, pottery and enamel-ware industries, and in granite and sandstone monument firms. During the five-year period, some 160 cases of silicosis, with or without tuberculosis, were discovered. The majority of these men are not disabled at present. While a few employers had established facilities for the pre-employment and periodic examination of their employees, for the majority of the workers the supervision provided has, in the past, consisted almost entirely of a rather piecemeal use of local or provincial x-ray clinics. Such supervision was deficient in several respects. First, because of the lack of pre-employment examinations, some men who were obviously poor risks entered employment in silica exposure. A few even had received recent sanitorium care. Secondly, employees could, though rarely did, refuse examination. The missing of a case of open tuberculosis in a foundry, of course, almost completely nullified the benefit of x-raying all other employees. Thirdly,

aside from the voluntary efforts of the Industrial Hygiene Division, there was no organized, province-wide attempt to provide periodic examination for the employees.

The Silicosis Act, which was passed in 1950, was the first step in placing pre-employment and periodic chest examinations on a systematic, industry-wide basis for employees in silica exposure outside the mining industry. The Act became effective in May 1952, when the Regulations were passed. The legislation requires the x-ray examination, at 18 month-intervals, of employees in silica exposure in 4 groups of industry:

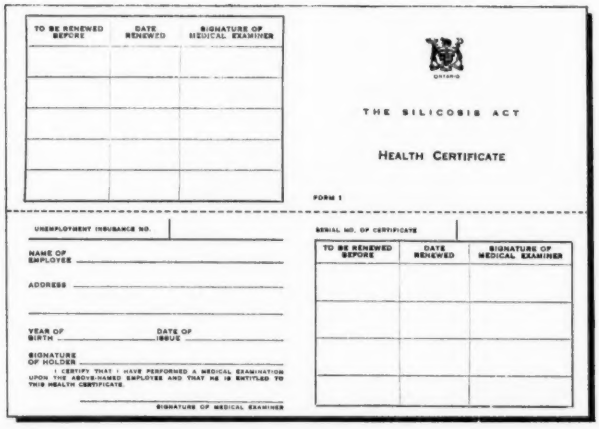
1. The foundry industry, where sand-moulding is used;
2. Porcelain, pottery and enamel-ware industries;
3. Granite and sandstone monument industries;
4. Industries in which furnace lining materials for steel production are manufactured or used.

The counties in the province are grouped into 10 zones. The legislation becomes effective in each zone on a date specified in the Regulations. These dates follow in chronological order at approximately 6-week intervals, the legislation becoming effective in the last zone on 19 October, 1953.

The examinations are the responsibility of the Division of Industrial Hygiene of the Ontario Department of Health, and are carried out by their mobile x-ray units, (Fig. 1) using 70mm. radiographic film for the preliminary screening of all employees. Where the miniature film suggests disease, the employee is recalled within 24 hours and a large film taken. At the same time the employee is examined clinically, if this is indicated. The examinations are compulsory. The Act states that no employee shall work in an industrial process involving a silica exposure unless he is the holder of a health certificate issued under the Regulations. Silica exposure is defined in the Regulations as exposure to the inhalation of dust from materials containing silica for 50 hours or more in each month, while the materials are handled, processed or used in any manner. It is the responsibility of the Director of the Division of Industrial Hygiene to designate the employees who must be examined. This is arranged during the visit of one of the Divisions' staff to each plant several weeks prior to the visit of the mobile unit.

For the purpose of the examination, employees are grouped in two categories. Group II, or "old" employees are those who were employed in silica exposure on 29 February 1952, or who have entered employment since that date but have been employed for 2 years or more in silica exposure in Ontario during the 5 years immediately preceding the date of employment. A Group I ("New") employee is one who entered employment in silica exposure on or after 1 March 1952 and who has had less than 2 years employment in silica exposure in Ontario during the 5 years immediately preceding the date of employment, or is an employee whose

Fig. 2


TO BE RENEWED BEFORE
DATE RENEWED
SIGNATURE OF MEDICAL EXAMINER
THE SILICOSIS ACT
HEALTH CERTIFICATE
FORM 1
UNEMPLOYMENT INSURANCE NO.
SERIAL NO. OF CERTIFICATE
NAME OF EMPLOYER
ADDRESS
YEAR OF BIRTH
DATE OF ISSUE
SIGNATURE OF HOLDER
I CERTIFY THAT I HAVE PERFORMED A MEDICAL EXAMINATION UPON THE ABOVE-NAMED EMPLOYEE AND THAT HE IS ENTITLED TO THIS HEALTH CERTIFICATE.
SIGNATURE OF MEDICAL EXAMINER

Health Certificate has remained expired for 3 years or more.

In addition to the regular survey clinics which are held every 18 months, the mobile units visit each plant, if necessary, every 4 months or less. During these visits employees who have been hired since the last clinic was held are examined for the purpose of issuing certificates. In addition, follow-up films and clinical examinations are obtained on those whose previous films indicated that such follow-up examination would be advisable.

Health Certificates (Figure 2) are issued to all Group II ("Old") employees except those who have active tuberculosis. The latter are, of course, in need of treatment for the tuberculosis, and until treated are a source of infection to their fellow-workers. A Group I ("New") employees may be rejected on evidence of old tuberculous disease as well as for active tuberculosis, since experience has shown that workers with old tuberculosis are poor risks for work involving exposure to silica dust. The finding of silicosis does not bar an employee from receiving a certificate, unless it is found that he is a Group I employee who has had less than 2 years' exposure to silica dust in Ontario in the four groups of industries specified, most of his exposure having occurred outside the province or in the mining industry.

Employer's Responsibility

The Regulations under the Act state that it is the employer's responsibility to:

1. Provide information on each employee in silica exposure.
   Name, address, year of birth, unemployment insurance number, occupation, period in silica exposure since last examination.
2. Inform employees of date, time and place of examination.
3. Retain custody of each certificate and deliver it to the employee when he leaves employment.

4. Permit inspection of certificates at any reasonable time by a medical examiner appointed under the Act, or by an Inspector from Ontario Department of Labor.

A Health Certificate expires if the holder has not been examined within 18 months of the date upon which the certificate was issued. An exception is made where the employee was unable to attend the clinic because of sickness or accident or other reason beyond his control, or where the medical examiner was unable to conduct the clinic. In such cases, the certificate remains in effect until the next clinic is held, which will be, as a rule, within the next 4 months. If the employee fails to attend the next clinic, the certificate is cancelled. Employees whose certificates have expired or have been cancelled in this way, or those who still hold health certificates but who are no longer employed in one of the 4 groups of industries specified, may receive an examination when a clinic is being conducted. Certificates are then issued just as if such persons were still Group I or Group II employees under the Regulations, with the exception of the Group II ("old") employee who had allowed his certificate to remain expired for 3 years or more. The latter are treated under the Act as Group I ("new") employees for the purpose of certification.

When a new employee is hired who is not the holder of a Health Certificate, he is required to make a signed declaration to the employer stating that he has never been examined under the Silicosis Act or its Regulations, nor has been refused an Initial Certificate under the Mining Act. Upon completion of this declaration, the employer is authorized to issue the new employee with a Temporary Health Certificate. The Temporary Health Certificate automatically expires when the employee has been examined within 4 months, at the next follow-up clinic, and issued with a Health Certificate or when such a Certificate has been refused, or when the employee leaves the plant, or when he fails to attend the next clinic to be held at the plant following his hiring, except for reasons beyond his control.

Employee's Responsibility

It is the employee's responsibility, under the Regulations, to:

1. Present himself for examination at the date, time and place specified by his employer.
2. Deliver his Health Certificate to his employer when applying for work involving silica exposure in one of the four groups of industries specified.

It is to the employee's advantage, when he leaves employment, to be examined under the legislation within each 18-month period, so that his Health Certificate may be renewed. This is particularly true where it is possible that he may some day return to employment in silica exposure. In the Toronto area, the x-ray facilities at the Division of Industrial Hygiene offices, 67 College Street, Toronto, are available to employees for this purpose.

Plant Physician's Responsibility

Though the employer may delegate to the plant medical department certain of the work for which the employer is responsible, the plant physician is not required by the legislation to perform any duties in connection with the examination of employees under the Act. However, the interest and cooperation of the plant medical staff is most important in facilitating the examinations and in ensuring proper supervision of employees both medically and in relation to their work.

Following a clinic, the Regulations require that the employer be given a report showing the number of men examined, the number of certificates issued, the names of men whose certificates were refused and the names of men who were *not* examined. The Regulations also require that employees whose certificates were refused be notified of this decision.

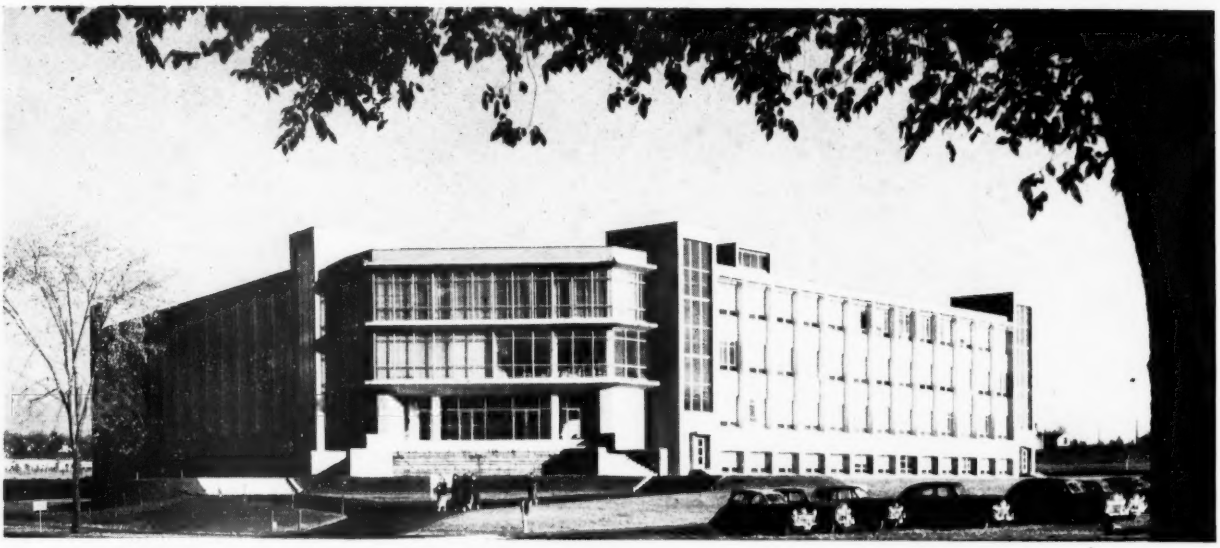
In addition, when an employee's x-ray shows evidence of disease (lungs, heart, etc.,) sufficient to warrant investigation or medical supervision, descriptive reports are sent, immediately after the x-ray clinic, to the family physician, the plant physician, and, where tuberculous disease is suspected, to the Medical Officer of Health.

The fee for each examination of an employee under the Act is $1.00 and is payable by the employer.

The act provides that any person contravening any provision of the Act or the Regulations shall be guilty of an offence and liable to a penalty, on summary conviction, of not less than $10.00 and not more than $100.00.

In certain industries covered by the Act, where the employer maintains a medical centre with x-ray facilities and retains a medical examiner appointed under the Regulations, examinations of employees may be carried out by the company as an alternative to examination by the Division of Industrial Hygiene. In such cases, the examination must be according to Regulations and at the company's expense. Health Certificates are issued by the medical examiner appointed, under the supervision of the Division of Industrial Hygiene.

Since the introduction of legislation in May 1952, the Division of Industrial Hygiene has received excellent cooperation for the most part from employers and employees. Problems have been encountered locally at times, and every attempt is made to resolve these to the satisfaction of the parties concerned. The follow-up clinics have already proven of utmost value in ensuring that the employee receives proper and prompt supervision, and the cooperation shown by plant physicians, Medical Officers of Health, general practitioners and sanatoria staffs has assisted greatly in this respect.



University Health Service

By A. Kenneth Young, M.D., Director
Student Health Service
University of British Columbia

The pattern of University Health Service with its provision of medical care to the student body is one that is still unfamiliar to many. It is by no means a new idea in university practice, having been introduced and gradually developed in universities and colleges in the United States since the middle of the last century. Large institutions such as universities have become increasingly aware of a measure of responsibility toward their students not only as regards formal education, but also in the matter of their health and welfare. This is particularly so in the case of universities having a large proportion of resident students. Here at the University of British Columbia, out of a total registration in the neighborhood of 5,400, 42% are from out of town and living either in university residences on the campus or in private lodgings near by. It is for these students especially that the therapeutic or treatment aspect has been more particularly developed.

At first glance it may seem that the load on such a service should be a light one, dealing as it does with a group of so-called "healthy young adults". Army screening figures, however, have always shown this to be an unduly optimistic view, and our own findings in no way disagree with those of the services.

All new students registering at the University of British Columbia receive a thorough physical examination at the Health Service, and, on an average, something over 45% of them are found to have defects requiring follow-up treatment. This entrance examination also serves to eliminate, as far as possible, health hazards to other students such as open tuberculous infection, and other communicable diseases. Certain groups, including athletic team members, medical students, and those majoring in physical education, also receive annual medical examinations. Chest x-rays are provided as a part of the examination as well as any other investigations that may be specifically indicated. Control of environmental risks to the student health is also a vital part of the program. Annual examination is compulsory for all campus food handlers and kitchen staffs, and, in cooperation with the local public health authority, inspection of campus sanitation and housing is carried out.

As an extension of the above preventive plan, the University of British Columbia has in the last two years developed full facilities for medical treatment. All students have free access to the two full-time Health Serv-

(continued on page 16)

University Health Service waiting room

Dental Health Services in Industry

By H. K. Brown, D.D.S.
Dental Consultant
Department of National Health and Welfare

An Industrial Dental Service is a service which is rendered for the purpose of improving and maintaining the productive capacity of employees through better health. A dental service provided as an inducement to accept employment or with a view to currying goodwill, or to helping the employees to get dental work done cheaply or for nothing, loses the main purpose of the service. Industrial dental programs are for health and production efficiency only, and should be explained to the employees as such. However, there are undoubtedly certain industries in Canada, located in communities which are largely satellite and too small to attract a dentist without the additional inducement of a part-time industrial practice. These are special cases calling for special arrangements to suit each situation. But, where it is possible to make a clear-cut distinction between the dentist's limited service to employees of the industry as an industrial dentist and his service to them and to the rest of the community in a full treatment capacity, it is advantageous to do so.

The dental rehabilitation of dentally crippled employees with many years back-log of tooth decay and gum disease is time-consuming and costly, and beyond the scope of industrial dental services. The service should be entirely preventive and emergency in nature, consisting of:

(1) Preplacement and regular oral examinations (including x-ray where the dentist believes it to be indicated)

(2) Prophylaxis at least once per year (cleaning for the prevention of gum disease and tooth decay)

(3) Diagnosis of dental and oral diseases, detection of oral symtoms of other diseases, and of incipient oral cancer, and referral of patients to their own dentists or physicians for treatment where required.

(4) Emergency treatment for the relief of pain, e.g., tooth extraction, lancing of abcesses, toothache treatments; care of accident cases; adjusting artificial dentures which may be causing pain; post-operative care (with the concurrence of the treating dentist).

(5) Care and supervision of industrial accident cases where the employer is responsible for the work being done.

(6) Protection of workers from spread of communicable oral diseases and other communicable diseases spread by mouth.

(7) Attending to any particular oral health hazard connected with the industry involved, e.g. pyorrhea among food-handlers, mouth conditions related to exposure to lead, mercury, phosphorus or acids.

(8) Cooperation with the plant medical services – referral of patients to the plant physician, and vice-versa.

This type of service makes it possible to give complete or almost complete dental coverage of the industry, with effective coordination with the general health service.

Gum disease and oral conditions arising from occupational hazards are for the most part preventable, either by proper care of the mouth, or by the adoption of proper precautions in relation to the job being done. Much tooth decay can be prevented by intelligent oral hygiene and dietary habits. Dental pain and oral ill health do not strike without warning as do certain other conditions. They result from long term neglect and ignorance. It takes from months to years (usually

years) for a cavity to become big enough to cause pain or an abcess. It takes even longer for gum diseases to destroy the gums and loosen the teeth and to progress to a point where general ill health results. A little bit of damage each year added to what was neglected the years before finally results in the breakdown of the oral machinery — and a big dental bill. There is no reason why this oral machinery, if given as much intelligent care as that demanded for the plant machinery, should not last for a lifetime and contribute much to the maintenance of a sound human plant.

The following points should be considered by an employer before establishing an industrial dental service:

(1) Are there enough employees to warrant it?
(2) Is a full time or part time dentist required?
(3) A full time dentist should have no office in any other place.
(4) If a part-time dentist is to be employed there should be a clear understanding with the other dentists of the community.
(5) The salary paid should be high enough to attract competent staff, capable of doing the work well, improving methods, and holding the respect of employees, employer and the local profession. The dentist should be able to administer his department and make decisions that are final.
(6) The dentist should be one who will cooperate fully with medical staff and the local dental and medical professions and be capable of supervising educational programs in dental health throughout the industry.
(7) A dental hygienist working under the supervision of the dentist may be needed where there is a large number of employees. She is trained to do prophylactic work and counsel patients, but she cannot handle emergency dental surgery and diagnosis.
(8) A dental nurse-receptionist will be required to assist the dentist and to keep records. (a very complete set of records should be kept, and systematically filed.)

Location and Type of Room for Clinic

The clinic should be part of or adjacent to the first-aid or health department and medical service wherever possible. It should be made large enough so that expansion is possible. It should normally consist of a waiting-room, operating room or rooms, laboratory and supply room, and an x-ray dark room. When a hygienist is to be employed, more than one operating room is necessary. The clinic should be finished pleasingly, with proper heat, light and ventilation. Good surroundings raise the employees' valuation of the service. This need not be expensive but should be typical of a dental office rather than just a stall back of some furnace or machinery. Partitions should go to the ceiling and entrances and exits should be equipped with doors that may be closed. The privacy thus obtained will be appreciated by the patient and also be a comfort to the waiting patient. All of these facts will make the employee feel that he is well thought of by the employer and thus make him a more cooperative employee.

Equipment Necessary

Dental chair; dental unit; x-ray unit; necessary operating instruments; instrument cabinets; x-ray dark room; view box for x-ray diagnosis; partitions that reach the ceiling; rubber mats at the chair; record files; desk for staff; wash bowls and sink; adequate library for work of program; adequate laundry supplies; drugs and supplies; sterilizer; film safe box; storage for supplies; fluorescent overhead lighting; chair and coat-rack in waiting room; subscription to a few picture magazines; telephone.

Official Recognition

Industrial dentistry has the recognition and approval of the Canadian Dental Association and all the provincial dental associations. These official dental bodies have expressed their willingness to cooperate and give advice to any industry contemplating an industrial dental service. The Canadian Dental Association makes available a very complete little publication* dealing with the subject.

An Important Place

Dentistry has an important place to fill in industrial medicine. General good health and efficiency cannot long be maintained in the face of encroaching gum disease and the gradual deterioration of the mastication machinery. Infection can spread from the mouth to other parts of the body. The pus discharge from pyorrhea pockets usually contains the type of bacteria responsible for food poisoning. Painful broken-down and missing teeth affect the comfort, the appearance, the choice of food and chewing efficiency. Oral tissues are the most sensitive reflectors of many types of ill health in other parts of the body, making it possible for the dentist to observe the onset of conditions requiring medical attention and to refer the patient to the plant physician. In many cases the plant physician needs the dentist's oral diagnosis because of the bearing it may have on his own findings. The effectiveness of an industrial health dental service is greatly enhanced by a competent dental section under the direction of a dentist who is qualified to place it in its proper relationship to industrial medicine.

* Industrial Dental Services, from Secretary of the Canadian Dental Association, 234 St. George St., Toronto, 5, Ontario.

Records in the Practice of Industrial Health

By Ian S. Maclean, M.D., D.I.H., Medical Director
Paulin Chambers Co. Ltd., Winnipeg

Progress in any science results largely from observation, experimentation and the recording of results. Man's level of intelligence and desire for knowledge has made him an observing and inquisitive individual who fortunately has always maintained an infinite respect for the past, be it historical or scientific, and particularly the recorded past as it is upon this knowledge that he has learned to deal with the present and plan for the future.

Thus, in the practice of occupational medicine, in which industrial nurses are playing a pioneer role, the records maintained in health and medical centres are the recorded facts upon which future progress in this special field will be made. However, the personal satisfaction of using accumulated information to improve the individual employee's medical and environmental status should compensate for the additional time spent in keeping and maintaining the basic records needed in any industrial medical service. All medical records should be treated as confidential information.

The medical record systems in use by different firms will naturally vary a good deal and are dependent on the size, physical layout, individual requirements and many other features of the industry. However, certain records can be established and adjusted to meet the requirements of the average industry. These can be discussed under two headings:

1. Administrative Records

II. Individual Records

I. *Administrative Records and Reports* should include routine daily reports, monthly or quarterly reports and an annual report giving statistical data together with a narrative summary of events. Of course the daily records are the most important as it is through the efficient management of these that simplicity in compiling the monthly, quarterly and annual reports, and other pertinent data can be achieved. The daily log is the usual mainstay for recording the visits to the health centre together with classification of the different cases. Later this information should be transferred to individual case records.

In the Paulin Chambers plant the log was discontinued when management enforced the rule that every employee must present a pass to the health centre. By using this pass (Employee Report Notice, Figure I) it felt that:

1. It would give the supervisor more control over his employees.
2. It would prevent loss of production time and would not interfere with the relief system.
3. The psychological effect would discourage unnecessary visits and help to control malingering.
4. The flow of employees through the health centre would also be controlled.

The pass is presented to the nurse on arrival and the time is stamped. After the necessary treatment and disposition the duplicate pass on which the nurse has made the necessary remarks is returned to the foreman by the employee. Information conveyed by the remarks will deal with such factors as:

(a) A possible change of work.
(b) Home for medical reasons, etc.
(c) Referrals, appointments, etc.

This report is later used by the personnel department for their *indirect labor report.* Instead of considering this a further time consuming factor we decided to discontinue our daily log and make the employee report notice the basis of our recording system. On the original copy which is kept in the health centre the nurse makes a provisional diagnosis and classifies the visits as occupational or non-occupational injury or illness; she also includes an anatomical description of the injury, the disposition of each case and any other pertinent information.

At the end of the shift the required statistical data is readily transposed onto a simple form (Daily Report, Figure 2) which breaks down the necessary information

Fig. 1

PAULIN CHAMBERS CO. LTD.

REPORT NOTICE

CLOCK No. .....
LOCKER No. .....

NAME ..... DEPT. .....

PLEASE REPORT TO

☐ DEPT. .....
☐ EMPLOYMENT AND PERSONNEL OFFICE
☐ .....

☐ MEDICAL CENTRE
TIME LEAVING DEPT. .....
TIME IN .....
TIME OUT .....

REMARKS .....

AT ..... TIME ON ..... DAY ..... DATE

BY .....

Fig. 2

INDUSTRIAL DAILY REPORT

Plant _____ Date _____ Nurse _____

	DEPARTMENTS																					
SURGICAL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Absentees	TOTAL
Synovitis																						
Muscle Strain																						
Hangnails																						
Lac. Cont. and Abr.																						
Infection																						
F. B. Eyes																						
Burns																						
Other Surgical																						
Sub-Total																						
Repeat Visits																						
MEDICAL																						
Dermatitis																						
Headache																						
Dysmenorrhea																						
Gastro Int.																						
Upper Resp.																						
Other Resp.																						
Ear, Eye and Teeth																						
Other Medical																						
Sub-Total																						
Repeat Visits																						
Severe Acc.																						

	M	F	Total	Defects Corrected	Total	Plant Insp.	P P	P N	
Physicals				Eyes					
Re-Examination				Teeth					
Histories				Tonsils					
Cold Vaccine				Others					
Special Tests									
Workmen's Comp.									
Lost Time									

REMARKS

into the desired classifications. This in turn provides the data from which monthly, quarterly, or yearly records can be compiled.

If a daily log is being used, this may be compiled to conform with the type, size and location of the industry. Information necessary would be: (a) time (b) date (c) name (d) time clock number (e) occuptional or non-occupational injury or illness (f) type of injury or illness and remarks. This would also have to be set up so that statistics could be easily totalled at the end of the shift.

In larger factories, where a greater number of employees are dealt with, a Kardex file system may be employed. With this convenient method an individual card for each employee is readily available on the nurse's desk and she can make immediate and final entries when the employee has visited the medical centre. However, in combination with this type of recording a code system may be necessary to save space on the card. Also a daily log (mimeographed sheets) has to be kept to maintain daily totals, and other information by entering check marks in the appropriate place.

If a monthly report is desired by management this should include:

1. Total visits to the dispensary
2. Total number of accidents
3. Number of severe accidents
4. Number of lost time accidents
5. Number of new medical cases, etc.,

with comments regarding any special work carried out or recommendations made.

Occasionally a quarterly report is requested and should be prepared even though the annual report only is required. If monthly or quarterly summaries are kept it will require little extra work to produce the annual report.

To establish some standard of measurement it is necessary to obtain the following information from the plant office or personnel department:

1. Average number of employees working over the year
2. Total man hours worked
3. Total number of production hours worked.

This information can be incorporated into the annual report to give management some guide for comparison of medical statistics with other firms. Also these figures are necessary to compile the frequency and severity Rates: i.e.;

$$\text{F.R. (Major Accidents)} = \frac{\text{No. of Injuries (Major Accidents)} \times 1{,}000{,}000}{\text{Man Hours Worked}}$$

$$\text{S.R. (Major Accidents)} = \frac{\text{No. of days lost} \times 1000}{\text{Man Hours Worked}}$$

$$\text{F.R. (Minor Accidents)} = \frac{\text{No. minor accidents} \times 1{,}000{,}000}{\text{Man Hours Worked}}$$

These rates together with the statistical totals in the annual report are useful instruments to acquaint management with facts related to health and accident prevention programs. This information, compiled into an annual report, will:

1. Disclose the departments, occupations and individuals with the worst injury record.
2. Show the type of injury that occurs most frequently.
3. Permit accurate judgment as to the most frequent causes of accidents.
4. Permit comparisons with previous periods thus showing whether the accident record is getting better or worse.
5. Help secure interest of foremen and workers alike in safety.
6. Assist in assessment of the effectiveness of the plant safety program by comparing it with other firms.

A variety of miscellaneous reports may also be kept or formulated by the plant nurse and these will depend largely on the requirements of management. They are prepared for special purposes and should not be considered confidential. They would include the accident report, Workmen's Compensation report, comments on absentee reports, etc.

Fig. 3

Paulin Chambers Co. Limited FIG. 3

MEDICAL CENTRE

REPORT OF ACCIDENT

To: Foreman or Forelady, Dept. ..... and Chairman of Safety Committee, (in turn)

Name ..... Dept. ..... Occupation .....

Location of Accident .....

Date of Injury 19 .... M. Hour Reported to Medical Centre 19 .... M. Hour

Witnesses .....

Patient States:

Provisional Diagnosis:

Disposition:
- ☐ Home
- ☐ Regular Work
- ☐ Special Work (see remarks)

To .....

Recommendation for investigation:
- ☐ None
- ☐ Routine
- ☐ Urgent Chairman Safety Committee also notified by phone)

Remarks:

.....R.N.

Plant Nurse.

INSTRUCTIONS

The value of this report is directly proportional to the completeness, accuracy and speed with which it is completed and forwarded. All entries, except signatures, should be typed, and all three copies kept together until "Closing Remarks" have been recorded by plant physician. Distribution of copies will then be made by the Medical Dept. to Plant Superintendent and Safety Committee. This report should be executed and forwarded by each individual concerned within 24 hours after its receipt. Only in this way can corrective action be taken promptly enough to prevent repetition of the accident.

MEDICAL CENTRE COPY

Fig. 4

DAILY ABSENTEE AND TARDINESS REPORT

Superintendent .....

Personnel .....

Nurse .....

Department		Foreman Forelady			Date
Clock No.	Name	Late	Absent A.M.	Absent P.M.	Reason

An accident report form (Fig. 3) is employed by most firms. This is filled out for all cases of serious or major injury or where any follow-up is likely and also for all eye injuries. When this form is completed with remarks by the worker, the foreman or forelady, the safety investigator, the doctor and the nurse, it serves as an excellent record for the use of the safety committee in determining causes of accidents and methods of correction.

The absentee report (Fig. 4) should pass through the medical centre for comments by the nurse. It is her duty to note known causes of individual absenteeism when these are medical in origin. 60–70% of absenteeism is genuinely due to sickness or injury: i.e.—

1. Industrial injuries
2. Non-industrial injuries
3. Sickness, chiefly respiratory, gastrointestinal and others.

Amongst the chronic absentees are inadequate and maladjusted individuals, dissatisfied workers, married women with household problems and persons with various other psychological problems.

II. *Individual Medical Records*

Following the pre-employment examination, we establish our confidential case history on each employee. We use a large manilla envelope for filing purposes. Our active filing system is done by time clock number. Continual clearance of the files is necessary according to the turnover. Inactive records are filed alphabetically and charts of transferred executives, pensioners or any records that might be needed for future reference, are retained in the medical centre. To assist the personnel in locating files of persons known only by name, a list-finder is kept on top of the filing cabinet with the names and time clock numbers.

Recorded on the front surface of the envelope is the name, time clock number and other necessary reference data such as: The dates of employment, initial examination, periodic examination, chest surveys,

their results and a column for remarks. The envelope contains:

(a) *The Physical Function Examination Card* (for the pre-employment or pre-placement examination)—set up to meet the needs of our plant, with the name, time clock number, age, previous occupation and past history. Here the nurse takes and records the history of the applicant and completes as much of the examination as is approved by the physician. Then the physician completes the examination and makes recommendations for the correction of remedial defects, placement of handicapped persons, and any other factors which relate to the health of the employee. Classification rating is explained to the applicant and sent to the personnel manager. At present, the following classification is in use:

Class A or I—Physically fit for any work.

Class B or II—Physically underdeveloped or has some minor anatomical or other correctable defect; otherwise fit for most jobs.

Class C or III—Employable, but, owing to certain impairments or conditions, requires special placement or medical follow-up, or both. Subject to approval by management for jobs compatible with existing conditions.

Class D or IV—Unemployable. (For the indusry specified.)

On the back of this card are spaces for periodic examinations. These examinations are most valuable and should be done regularly on:

1. Workers in hazardous jobs.
2. Operators of moving equipment, especially when the lives of others are at stake; i.e.—crane operators, train and truck drivers, etc.
3. Employees with known disabilities.
4. Very young and very old workers.

Naturally, all employees of a firm should be examined once in 2—3 years, if possible.

(b) *The Medical Record Sheet*—On the initial visit to the health centre, after employment has commenced, the personal medical record sheet is added. On this is posted every service rendered to each individual employee in chronological order, injuries in red ink and illnesses in black. Personal remarks, attitudes, and other relevant data are noted and all complaints are significant. Results of laboratory tests, and outside consultations can be posted on either the physical function examination card or the personal medical record sheet. The accumulated list of accidental injuries and illnesses recorded on the individual chart will show at a glance those workers who are accident or illness-prone. This information on each individual plays a most important role in the practice of industrial health. Through knowledge of the physical assets or disabilities, the record of accidents and illnesses and the general attitude toward health of any employee, it is possible to assess his actual ability and general worth to your firm.

These progressive notes present a more reliable and comprehensive picture of the worker's ability than can be obtained at the pre-employment examination. If the worker (who has been employed for any length of time) is being re-evaluted for promotion, transfer, lay-off, re-employment, or other purpose, at the request of top management, the plant physician can study this record in making the re-assessment from the medical point of view.

The individual absentee record, whether kept in the health centre or available in the plant office, or the office of the personnel manager, will indicate the chronic offenders and should stimulate an investigation into the medical, mental, marital and economic background of the absentee. Very often assistance from the medical or welfare departments can put an employee back on his feet and convert him into a regular, useful worker. Two large firms in England have gone so far as to provide small loans and to obtain better living accommodations for some of their employees through a welfare department. However, the plant medical service, that is the nurse and doctor, can often do a great deal to get an employee over a difficult personal or family situation, even if they do nothing more than listen to his or her story and offer advice.

From analysis of the daily records of various plant dispensaries it has been shown that 80% — 85% of accidental injuries and medical complaints are produced by 30% of the total employees in a plant. Another 15%—20% of medical problems are produced by 60% of the employee body and 10% of employees have no injuries or medical complaints at all. Moreover, members of that 30% who cause the majority of visits to the medical centre will continue to have accidents and minor ailments if left to their own devices. These types are our "faulty human tools", according to Dr. William Fulton, Medical Director of the General Motor Corporation in Detroit. In his article on "Records" published in 1944 he goes on to say that while we will always have a certain percentage of these individuals in any given group of workers, it is quite wrong to simply accept this fact and do nothing about it. On the contrary, by using the individual medical case record to detect the accident-and-illness prone worker early in his term of employment and by determining the nature and source of his difficulties, a good number of these people may be converted into more useful and efficient individuals.

In conclusion let it be said that from daily records, simple monthly, quarterly and annual reports can be compiled. Information from these provides collective and comparative statistics which can be of great value in determining the trend of illnesses or accidents or of any specific occupational health condition in a plant. Moreover, these accumulated data indicate to manage-

(continued on page 16)

Industrial Ventilation — Some Basic Considerations on its Application

By Sarto R. Plamondon, P. Eng., Chief Engineer
Division of Industrial Hygiene
Quebec Ministry of Health

Ventilation is considered to be the only sure way of controlling air contamination by dusts, vapors, gases and fumes, but it is often found that the necessity for well-planned and properly designed ventilation systems is not fully recognized. In some instances, better results could be obtained with the handling of smaller volumes of air if the ventilation system had been properly planned in the first place, and even in well-planned systems, poor maintenance or faulty construction will result in reduced efficiency.

Control of air contamination may be effected by either general (also called dilution) ventilation, or local exhaust ventilation.

Let us compare the advantages and disadvantages of these two methods.

General Ventilation

General or dilution ventilation is so called because it involves the movement of a sufficient volume of clean air into an area to dilute the air contaminants to a point where their concentration is not harmful.

The advantages of general ventilation are:

(a) It is simple and economical to install.
(b) The equipment installed does not interfere with industrial processes.
(c) It is more flexible in plants where the layout has to be altered from time to time.
(d) It is more desirable in workrooms where there is widespread use of volatile substances.
(e) It will assist in heat control during the warm season.

The principal disadvantages of general ventilation are:

(a) In many instances it will increase heating costs, especially during cold winter months.
(b) It is difficult to obtain good dilution at the source of contamination without using excessive amounts of air.
(c) It is not very efficient for control of dusts and fumes because of the poor dispersion of these contaminants.

From the above-mentioned points it is obvious that the practical application of general ventilation is limited to a few particular situations, and it should be installed only after it has been carefully compared with a local exhaust system under similar conditions.

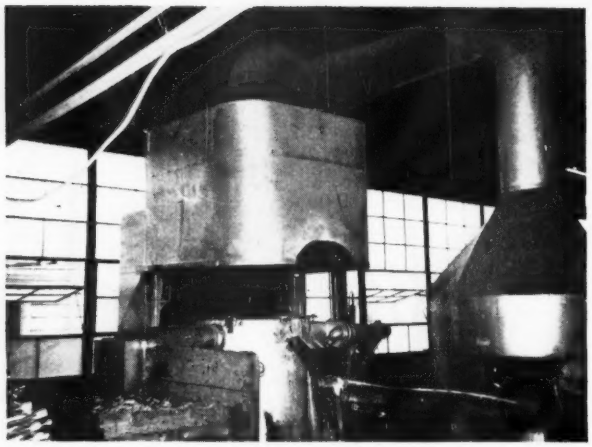
Local Exhaust Ventilation

The most efficient means of controlling air contamination is by local exhaust ventilation, a system operated by suction, which removes the contaminating materials at their point of origin. The system consists essentially of a hood (a partial or total enclosure around the source of contamination), an air duct through which the contaminating substances pass from the hood and a fan to create the suction.

This type of ventilation equipment offers the following advantages:

(a) It prevents the air contaminants from reaching the breathing zone of the workers.
(b) It effects control with a minimum of air exchange.
(c) It reduces the amount of housekeeping necessary to maintain cleanliness and sanitation.
(d) It reduces the cost of air cleaning equipment when it is found necessary to decontaminate the air before it is exhausted to the atmosphere.
(e) It does not generally increase heating costs during cold weather because of the small amount of air handled.

A typical local exhaust set-up



Exhaust hood over melting and holding furnace.—Courtesy Division of Industrial Health, Michigan Department of Health.

However, local exhaust systems present certain disadvantages:

(a) They are more costly to install due to the more elaborate equipment and construction.

(b) They require good maintenance and supervision.

(c) Workers may consider that exhaust hoods interfere with certain operations and be reluctant to use them.

(d) They must be especially well-designed for maximum efficiency.

Some Reasons For Poor Performance Of Ventilation Systems

(a) Lack of "make-up" air to replace air removed by the exhaust system. This situation is frequently encountered in relatively small rooms which are constructed especially for the handling of toxic materials. As much air must enter a room as is exhausted if a ventilation system is to operate properly.

(b) The installation of fans too close to air inlets. This causes a short-circuit in the ventilation and the supply of incoming air will be exhausted before it can properly dilute the air in the work area.

(c) The location of air inlets where they will produce draughts on the workers during cold weather. Workers in such areas are likely to shut off ventilation fans or block air inlets.

(d) Local exhaust systems fail because of poor hood design or because air velocities are insufficient to trap or convey contaminants. Hoods are often too high above sources of contamination or fail to enclose operations as much as possible. Air velocities may be reduced by faulty pipe connections.

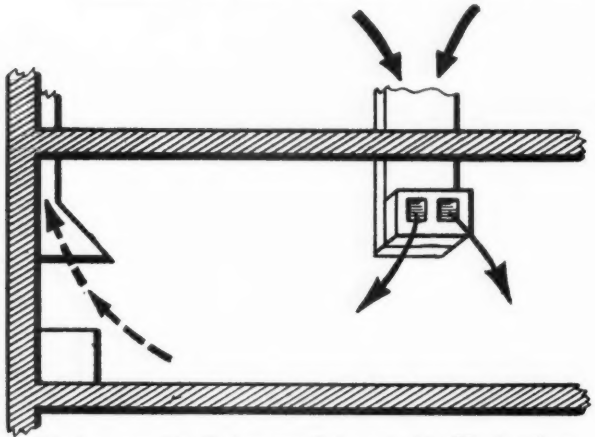
(e) The use of propeller fans on high resistance systems where such fans are not effective.

(f) The installation of additional exhaust openings in a system without making the necessary changes to account for the increase in the volume of air handled and subsequent increase in resistance.

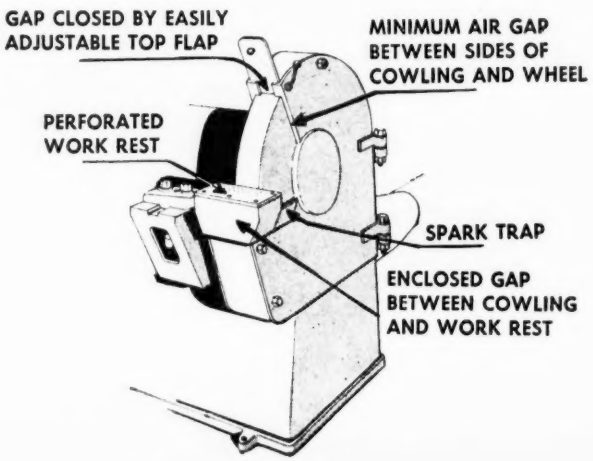
(g) Failure to design a system with all suction openings working. It is sometimes considered, that, since exhaust hoods are not all used simultaneously, blast gates can be used to close unused sections, and calculation of the capacity of the system is based on this assumption. This represents poor planning and designing and the system will be inefficient when it is necessary to use all openings at once.

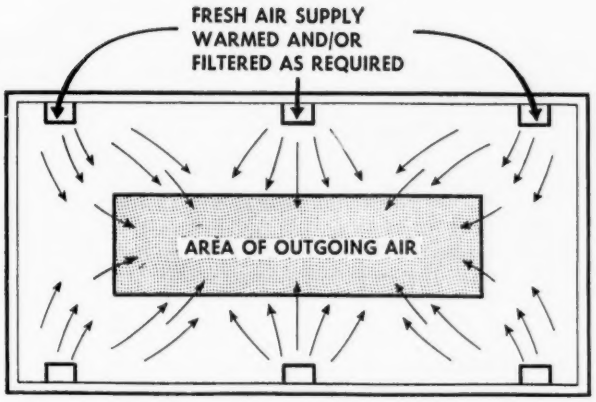
(h) Failure to install clean-out openings for easy access to the pipes for cleaning purposes.

(i) Fan running backwards. Incredible as this may appear, it has happened on certain occasions.



Make up Air Balances Exhaust Air Eliminating Cold Drafts And Controlling Infiltration.


GAP CLOSED BY EASILY ADJUSTABLE TOP FLAP
MINIMUM AIR GAP BETWEEN SIDES OF COWLING AND WHEEL
PERFORATED WORK REST
SPARK TRAP
ENCLOSED GAP BETWEEN COWLING AND WORK REST



(j) Failure to operate the fan for a sufficient period of time at the end of the day's work, or in some cases, during working period. This may be due to the lack of proper supervision or the lack of a responsible authority who understands the principles of ventilation.

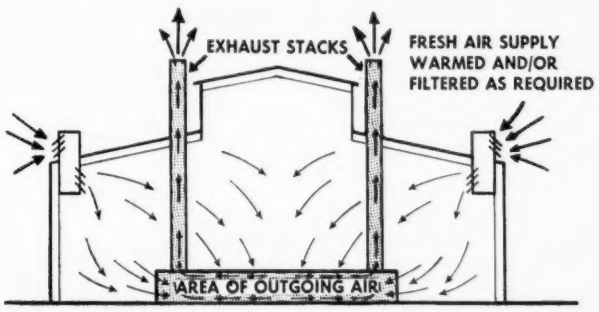
(k) Ineffective collectors which allow the contaminated air to recirculate in the workroom; failure to clean air filters at regular times with the result that they become plugged with dirt; caking of cloth filters due to hygroscopic materials in the workroom air; and too high velocities of air through cloth filters.

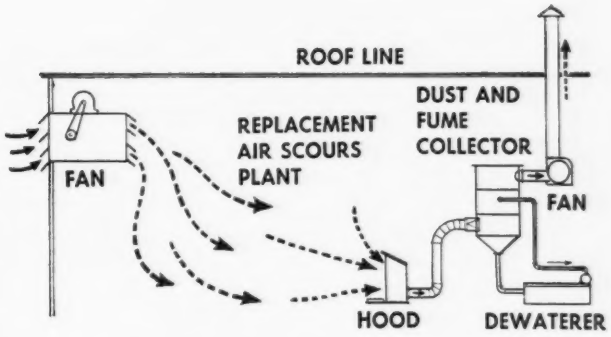
(l) Location of air inlets too close to exhaust outlets which will result in recontamination of the area.

(m) Improper types of collectors for the contaminating materials.

(n) Installation of unproven and ineffective methods of control for specific contaminants. A good example of this is the installation of ozone operators to detoxify carbon monoxide. Ozone has been proven to have no real value for this purpose.

Surprising as it may seem, many of the above-mentioned situations can and do occur, and they are often responsible for a lack of confidence in methods of ventilation, with the result that an industrial organization is reluctant to spend money for new equipment after it has met with experiences of this sort in already existing systems.





In conclusion, it may be said that faulty and inefficient ventilation usually results from poor planning, poor maintenance, inadequate construction, or any combination of these factors.

For maximum efficiency, the following points should be considered when constructing a ventilation system:

(a) A good engineering design is an important factor and it should be based on a careful study of the type of contaminants present and the various processes involved.

(b) Once a ventilation system has been installed, no change should be made without first considering the effect of such changes on the efficiency of the system. In a balanced local exhaust system, the addition of an additional exhaust inlet may reduce the efficiency of other parts of the system to such an extent that they must be rendered useless.

(c) Good maintenance of ventilation system is of the greatest importance. Too often, once it is installed, a system is neglected; after a while chiptraps become blocked, abrasions in pipes produce leaks, collectors become clogged, thus increasing the resistance of the system and reducing the volume of air handled, and finally repair costs become so prohibitive that they practically necessitate a new installation.

Like any other process installation, local ventilation systems are part of the production layout and they should be given the same care as the machinery to keep them in good working condition. Their efficiency is not always limited to the control of the danger to the health of employees; they can become an asset by diminishing maintenance cost, by reducing wear and tear on machinery and by providing a means of recovering products which may prove to have considerable market value.

The Role of Psychiatry in Industrial Health

By A. A. MacVicar, M.D., Assistant Director
Division of Mental Health
Prince Edward Island Department of Health and Welfare

The last half century has witnessed many new developments in the field of industry and one of the most significant of these has been the recognition of the importance of good health and work satisfaction of the worker in the overall industrial scheme. The advantages to worker and management alike, which have resulted from proper job placement, training programs, improved medical care, better working conditions, efficient safety programs and many other factors, have more than repaid the cost. In recent years, there has been an increased stress on the importance of the attitudes and emotional needs of industrial workers as a means of understanding their reactions in various work and social situations.

Attitudes towards authority, fellow workers, family, friends and other groups or individuals are governed largely by the degree of satisfaction of certain basic needs. The industrial worker feels the need to belong to a group. He feels the need for security, some satisfaction in his job, recognition of his work, and finally he feels a need for adequate opportunity for advancement. Now let us look at these needs more fundamentally. Each one seems to rest on the deep dependency needs and the need for trust which we all have. From the psychiatric viewpoint, recognition of one's dependence on others and acceptance of it is a primary need. We seem to forget that we were all born dependent, remained that way for a long time consciously and though many try to deny it, we are dependent till we die.

Here are some of the ways individuals react to feelings of dependency. The healthy person — the so-called mature person — recognizes and accepts his own dependency need and deals with it by recognizing the same need in others and accepting it. He will not attempt to satisfy his own needs at the expense of the reasonable needs of another. He is a useful employee and a satisfactory citizen. The unhealthy person, on the other hand, may react in two ways — by being too dependent or by trying to show that he is not dependent at all. The over-dependent individual is afraid to make decisions, never shows initiative, is a "yes-man", a hanger-on in group meetings. He takes from people, from society, but never gives. This is the type of person who appears on sick parades and who makes up for his lack of action in the emotional sphere by developing bodily symptoms and nervous complaints. Then there

is the type who tries to hide his dependence, feeling that it is a weakness that should be denied, and continually strives to prove his independence. He may show his inner attitude by excessive ambition, by his drive for power, money or responsibility, by his resentment against authority, his scorn of advice and by his rigid authoritarian or harsh attitudes. People of this type are not recognized as unhealthy as quickly as those of the over-dependent type, because the drive that many of them exhibit aids the company they are working for — at least for a while. However, eventually they often develop emotional and physical symptoms which need treatment. They may develop ulcers, high blood pressure, coronary trouble or anginas, or they may become what the psychiatrist calls "paranoid"— people who are overly suspicious and who mistrust everyone. They often cause more active harm to an organization than the first type since they may disrupt the group spirit and cause resentments and dissatisfactions.

The dependency need includes need for trust. The observers in one famous study, known as the Hawthorne Study, found the lack of trust a remarkably constant trait in all the workers. The workers did not trust management and felt that management did not trust them. Since those days, however, management and unions have both been attempting to build up more trust. In some instances, especially in individual businesses, there has been remarkable success. Life Magazine, January 5th, 1953, describes one company as "The Company of Smiling Employees". Company advertisements in national magazines proudly show army veterans returning to jobs held for them; other advertisements show satisfied fathers and sons working in the same factory. The need for trust is recognized, and all means are being used to cultivate it, but it is still not individually accepted as a mode of conduct. As with dependency, trust must be developed in people in their childhood, and during their growing years, where they accept it in themselves and expect it in others.

Informal Groups

We know that informal groups are formed in every organization to try to satisfy these conscious and unconscious needs of dependency and trust. The worker's emotional security is strengthened when he feels he is part of a group which is really separate from the strict business setup. Like animals pressing together for warmth, the members of the groups derive some emotional warmth from one another.

These groups are still being formed in spite of the fact that most industries have personal relations officers who are carefully chosen for their ability to get along with people and for their skill and sincerity in understanding worker and management problems. These officers are often looked upon with affection by members of the organization. The same attitude applies to modern plant physicians and psychologists. Many members of the organizations regard these people not only as professional advisors but as friends to whom they can tell their troubles, and the workers receive excellent advice and assistance from many of these specialists. Yet with all this support there is a steady loss to industry through emotional illnesses.

A Recent Development

Psychiatry has come into this picture only relatively lately. During World War II, psychiatrists in Canada, the United States and Britain were employed in selection methods, in developing training programs, and in treating workers who were not so ill that they had to leave their jobs. After the war, however, few psychiatrists were retained, and in 1951 less than ten were employed full time by industry and labor in the United States. I do not know of any psychiatrist employed full time in Canada. This is in contrast to the practice of the American Army, which has a psychiatrist up near the front lines to be near the soldiers who may break down in battle. Because of the immediate attention which soldiers with battle neurosis now receive in Korea, over 80% can be safely returned to duty whereas in other wars, due to delay in recognition and treatment, only 20—30% of them had been returned. The worker on the home front also seems to be in a battle against a form of living to which he does not seem to be able to adjust satisfactorily. Psychiatry is trying to find out how it can help. But as yet there is no satisfactory solution.

However, in several universities in Canada, the United States and Britain, professors of psychiatry are being asked to supply lectures and courses to men engaged in industrial work, such as engineers, executives of industries and labor leaders. An English psychiatrist has published lectures which he gave to industrial workers. In Dalhousie there is a course in psychiatry for engineers—a very popular one. In McGill, the professor of psychiatry has published his courses held for executives. In Toronto the Industrial Relations School works closely with the psychological and psychiatric departments. In the United States there is a school of Industrial and Labor Relations at Cornell University to train industrial psychiatrists in all phases of industry, in addition to individual and group psychology.

There is at last a growing conviction in industry that emotional problems are of prime importance, and psychiatry, with the other sciences, is making extensive preparations to handle them more actively in the immediate future.

University Health Service

(continued from page 4)

ice physicians and the public health trained nurses on the staff. Psychiatric consultations are also provided, and, where necessary, the student may be hospitalized in the Health Service Hospital. This last is a fully-equipped and well-staffed twenty-six bed unit located in the Health Service building, and it deals with all types of medical ailment. Surgical or obstetrical cases, however, are referred to the city hospitals. The University Health Service Hospital is fully accepted under the British Columbia Hospital Insurance scheme and is therefore free of charge to students holding this insurance coverage. Facilities for isolation of communicable disease are, of course, provided in the hospital, and it is felt that they have played a major part in the prevention of epidemics in the various dormitories and residences.

The well worn platitude of a healthy mind in a healthy body deserves repetition, and it is by seeking to improve both mind and body that we hope to produce the type of graduate who will be of the greatest value to the community. As future leaders of the people, the standards which they achieve and maintain can and do reflect on the well-being of the country as a whole.

It is hoped that, as a result of both the preventive program and the wider medical service offered, the general health level of the postgraduate population will be improved. The aim of a university is to apply the process of education to the developing mind during the years of early adult life, and through a comprehensive health service such as ours, we feel that an equal influence can be brought to bear in promoting and maintaining the health of the body during these same vital years. It is in those years that seeds of trouble sown in the system may, if not corrected, produce a harvest of ill health in later life.

Records in the Practice of Industrial Health

(continued from page 10)

ment the work done by their medical department and often prove its value. Accurate interpretation of statistics can only be done when accurate information is recorded. Statistics should always be considered in the light of other factors, such as the volume of production, labor turnover and environmental conditions. Misinterpretation of statistical information may be illustrated by the story of the surgeon who after examining a patient, smiled confidently and said: "You have a serious condition which will require an operation, but I can guarantee a satisfactory recovery." And the patient asked, "How, doctor, can you be sure of a good result?" The doctor replied, "Well, statistics show that in this condition only one out of five patients survive the operation, and I have just lost my last four cases!"

Lastly, establish a sound system of recording the total daily effort of your health service and maintain it in such a way that both your individual employee medical charts and your monthly or annual summaries become useful instruments in promoting the health and morale of your plant employees and in enlightening management concerning the function and value of the Industrial Health Service in your particular organization.

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Index to Previous Issues of the Occupational Health Review

VOLUME 1, NUMBER 1 JANUARY 1949

A Field Instrument for the Determination of Low Concentrations of Methyl Bromide and other Halogenated Hydrocarbons
Disposal of used Fluorescent Lamps
Group Detection of Lead Absorption among Exposed Workers
Total Health in an Industrial Medical Service
Cancer of the Respiratory System in the United States Chromate-Producing Industry
Radium Type Static Eliminators
Dust Analysis Service of the Industrial Health Laboratory, Ottawa
Occupational Disease in Differential Diagnosis
A Message to Industrial Nurses
Results of Dust Survey in Alberta Coal Mines
Health Films for Industry
A Canadian Book on Occupational Diseases
A Proposed Uniform Industrial Hygiene Code
Carbon Monoxide in Garages
International Industrial Medicine

VOLUME 1, NUMBER 2 MAY 1949

Precautions in Industrial Uses of Radioactive Isotopes
Undergraduate Medical Training in Occupational Medicine and Hygiene
Nurses in Convention
The Plant Inventory A Guide to Industrial Hygiene Practice
A Manual for Industrial Nurses
Group Medical Services for Small Plants
Health Effects Associated with Beryllium
Health Education in Industry
Lead Hazards at Scrap Burning Operations
State and Industrial Health in India
U.S. Smog Disaster Studies

VOLUME 2, NUMBER 1 JANUARY 1950

Opportunities for Group Health Instruction in Industry
Atmospheric Pollution
The Scope of Industrial Health Services from the Point of View of Industrial Medicine
Panel Discussion on the Selection and Training of Industrial Nurses
The Need for Developing Techniques of Selection and Training.
The Selection of Nurses for Industry
Preparation for Industrial Nursing
Training within Industry or On The Job Training
The Diabetic in Industry
The Use of Bal in Heavy Metal Poisoning

VOLUME 2, NUMBER 2 OCTOBER 1950

Operation Rehabilitation
Increasing Interest in Industrial Nursing
Lost Time in Industry
Health Implications of Air Pollution
Investigations on Dust Concentrations in the Granite Industry
Lead Hazard in an Enamel Plant
An Ounce of Prevention is Worth a Pound of Cure
Changing Concepts in Occupational Health
A Consideration of Basic Personnel Policies for Industrial Nurses

VOLUME 3 NUMBER 1, DECEMBER 1951

Industrial Health Services in Civil Defence
Industrial Hygiene Survey of the Printing Industry in Halifax
The Assessment of Radiation Hazards from Fluoroscopic X-Ray Machines for Shoe Fitting
Scope of Medical Services in Industry
The Industrial Nurse in the Community
The Radiation Problem and Physics in Industrial Health
The Collection and Utilization of Data on Lost-time Morbity in Industry

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Manual Artificial Respiration—The Holger Nielsen Method
Some Fundamental Air Pollution Problems
Health Education in Industry
Parathion Exposure and Cholinesteras Response of Quebec Apple Growers

VOLUME 4, NUMBER 2 MARCH 1953

Physical Rehabilitation
Noise
Problem Drinking in Industry
Spotlight on the Health Centre
The Role of the Emission Spectrograph in Occupational Health Investigations

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